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# *Indian Standard*
# SPECIFICATION FOR LINDANE
## *( First Revision )*

Second Reprint OCTOBER 2000

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**BUREAU OF INDIAN STANDARDS**
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

**Gr 2** *November* 1984

# Indian Standard

# SPECIFICATION FOR LINDANE

## ( First Revision )

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# TO
# IS 882 : 1984 SPECIFICATION FOR LINDANE
## *(First Revision)*

(*Page* 5) — Insert the following Appendixes at the end of the text:

## APPENDIX A

### DETERMINATION OF GAMMA-ISOMERS CONTENT PERCENT BY MASS

**A-0** For the determination of gamma-isomer content gas chromatographic (GLC) (*see* **A-1**), should be followed.

### A-1 GAS CHROMATOGRAPHIC METHOD

**A-1.1** Gas liquid chromatograph fitted with a flame ionization detector (FIS) is used for this determination. Using solution containing known amounts of the standard Gamma-Lindane and internal standard, the response factor *R* for Gamma-Lindane and internal standard is arrived at. A solution containing a known mass of sample solution and internal standard is injected subsequently into the GLC unit. The percentage of Gamma-Lindane is then computed by standard relationship.

### A-1.2 Apparatus

**A-1.2.1** *Gas Liquid Chromatograph* — Equipped with a flame ionization detector (FID) and coupled with suitable integrator. The suggested parameters are given below which can be changed depending upon the available equipment and allied facilities, provided standardization is done.

**Column** — glass 183 cm length and 4 min i.d., packed with 5 percent OV 210 on chromosorb W-HP 9100-120 mesh or suitable equivalent.

**Price Group 1**

| | |
|---|---|
| *Gas flow*: | |
| Carrier gas (nitrogen) | 30 ml/min |
| Fuel gas (hydrogen) | 30 ml/min |
| Air | 300 ml/min |
| *Temperature*: | |
| Column oven | 160°C |
| Injection port | 220°C |
| Detector | 240°C |
| Chart speed | 0.5 cm/min |

*Injection size* : 2 µl

**A-1.2.2** *Microsyringe* — 10-µl capacity.

### A-1.3 Reagents

**A-1.3.1** *Acetone-Analytical Reagent Grade*

**A-1.3.2** Gamma-Lindane standard of known purity.

**A-1.3.3** *Internal Standard* — alpha-naphthol of known purity.

### A-1.4 Perparation of Standard and Sample Solutions

**A-1.4.1** *Preparation of Internal Standard Solution*

Weigh accurately 150 mg of internal standard into a 100-ml volumetric flask and make up the volume using acetone. This will contain 1.5 mg/ml of the internal standard.

**A-1.4.2** *Preparation of Standard Gamma-Lindane Solution*

Weigh accurately 20 mg of standard Gamma-Lindane into a 10-ml volumetric flask, and 5 ml of internal standard solution (**A-1.4.1**) and make up the volume with acetone.

**A-1.4.3** *Preparation of Sample Solutions*

**A-1.4.3.1** *For lindane technical and EC formulation*

Weigh accurately a quantity of sample containing equivalent of 20 mg of active ingredient into a 10-ml volumetric flask, add 5 ml of internal standard solution and make up the volume with acetone.

**A-1.4.3.2** *For BHC DP and WP formulation*

Weigh accurately a quantity of sample containing equivalent of 20 mg of active ingredient (Gamma-Lindane) into a 25-ml volumetric flask, add 5 ml of internal standard solution and 5 ml acetone.

Cap each flask tightly and gently swirl the contents for one minute using a rotational motion of the wrist. Allow each flask to stand for at least 5 minutes and then shake for 1 minute.

### A-1.5 Estimation

**A-1.5.1** Inject 2.0 μl portions of standard Gamma-Lindane solution until response factor (peak area) for Gamma-Lindane to internal standard agrees to within 2 percent.

**A-1.5.2** Inject duplicate aliquots of the sample solution using same column as that of standard. Measure the response factors and compute Gamma-Lindane content.

### A-1.6 Calculation

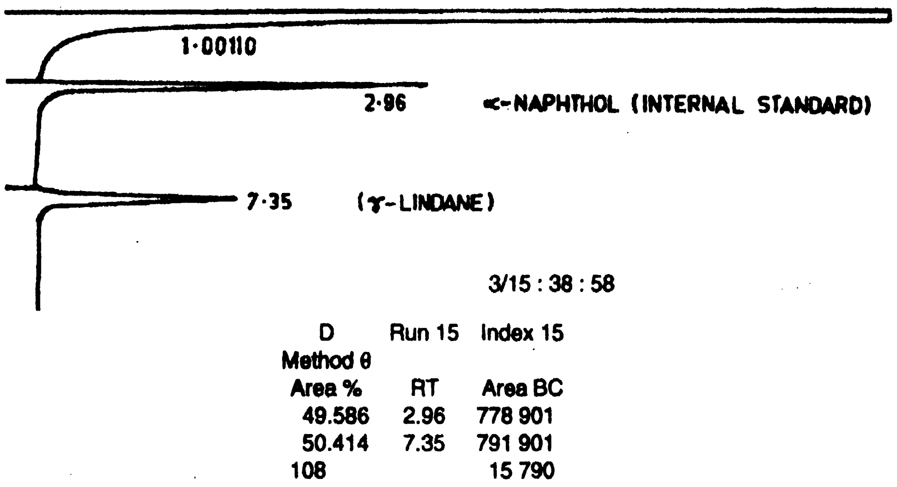
$$\text{Response factor } (R) = \frac{\text{Area of Gamma - Lindane peak}}{\text{Area of internal standard peak}}$$

$$\text{Gamma-Lindane content, percent by mass} = \frac{R \times W \times P}{R \times W}$$

where

$R$ = response factor for sample solution;
$W$ = weight of sample;
$P$ = percent purity of the Gamma-Lindane standard;
$R$ = response factor for standard solution; and
$W$ = weight of Gamma-Lindane standard.

NOTE — A typical chromatogram for the internal standard and standard Gamma-Lindane solution is prepared for reference (*see* Fig. 1).



```
        D      Run 15   Index 15
Method 0
   Area %      RT      Area BC
    49.586    2.96    778 901
    50.414    7.35    791 901
   108                  15 790
```

FIG. 1 TYPICAL CHROMATOGRAM FOR THE INTERNAL STANDARD AND STANDARD GAMMA (HCN)—LINDANE USING 5 PERCENT OV-210 COLUMN

# APPENDIX B

## DETERMINATION OF ACIDITY OR ALKALINITY

### B-1 QUALITATIVE TEST

**B-1.1 Procedure**

Take about 0.5 g of the material in a test tube. Mix with about 1 ml of neutral acetone and warm gently to effect solution of the BHC present in the material. Cool and add 1 ml of water to it and then test the solution for acidity with a litmus paper. Determine the acidity by the methods prescribed under **B-2**.

### B-2 DETERMINATION OF ACIDITY

**B-2.1 Reagents**

**B-2.1.1** *Acetone*

**B-2.1.2** *Methyl Red Indicator Solution* — aqueous, 1 percent (*m/v*).

**B-2.1.3** *Standard Sodium Hydroxide Solution* — 0.05 N.

**B-2.1.4** *Standard Hydrochloric Acid* — 0.05 N.

### B-2.2 Procedure

**B-2.2.1** Weigh accurately about 10 g of the material into a dry conical flask, add 25 ml of acetone and mix. Warm the flask gently to effect solution of the Lindane present in the material. Cool, add 75 ml of water, filter and then titrate immediately with the standard sodium hydroxide solution using methly red as the indicator.

**B-2.2.2** Carry out a blank determination using 25 ml of acetone diluted with 75 ml of water.

### B-2.3 Calculation

$$\text{Acidity (as HCl), percent by mass} = \frac{3.646\,(V - v)\,N}{M}$$

where

$V$ = volume, in ml, of the standard sodium hydroxide solution required for the test with the material;
$v$ = volume, in ml, of the standard sodium hydroxide solution required for the blank determination;
$N$ = normality of the standard sodium hydroxide solution; and
$M$ = mass, in g, of the material taken for the test.

**B-2.3.1** In case the blank shows alkaline reaction, neutralize with the standard hydrochloric acid and calculate as follows:

$$\text{Acidity (as HCl), percent} = \frac{3.646\,(VN + vN_2)}{M}$$

where

$V$ = volume, in ml, of the standard hydroxide solution, required for the test with the material;
$N_1$ = normality of the standard sodium hydroxide solution;
$v$ = volume, in ml, of the standard hydrochloric acid required for the blank determination;
$N_2$ = normality of the standard hydrochloric acid; and
$M$ = mass, in g, of the material taken for the test.

(FAD 1)

**Reprography Unit, BIS, New Delhi, India**

# *Indian Standard*
# SPECIFICATION FOR LINDANE
## *( First Revision )*

## 0. FOREWORD

**0.1** This Indian Standard ( First Revision ) was adopted by the Indian Standards Institution on 31 July 1984, after the draft finalized by the Pest Control Sectional Committee had been approved by the Agricultural and Food Products Division Council and the Chemical Division Council.

**0.2** Lindane essentially comprises the *gamma* isomer of benzene hexachloride and is obtained by suitable processing of either BHC technical or BHC refined to eliminate other isomers. The material is employed in large quantities in the preparation of a number of insecticidal formulations used in the control of insect pests of medical, veterinary, animal husbandry and agricultural importance.

**0.3** This standard was first published in 1956. It is being revised to make its requirements up-to-date. The title has also been revised.

**0.4** In the preparation of this standard, due consideration has been given to the provisions of the *Insecticides Act*, 1968, and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under these, wherever applicable.

**0.5** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

## 1. SCOPE

**1.1** This standard prescribes the requirements and the methods of sampling and test for lindane.

---

*Rules for rounding off numerical values ( *revised* ).

## 2. REQUIREMENTS

**2.1 Description** — The material shall be in the form of granules or flakes or powder, free from extraneous impurities or added modifying agents, and shall be white or near white in colour.

**2.2** The material shall also comply with the requirements given in Table 1.

### TABLE 1 REQUIREMENTS FOR LINDANE

( *Clauses* 2.2 *and* 5.1 )

| SL No. | CHARACTERISTIC | REQUIREMENT | METHOD OF TEST, REF TO | |
|---|---|---|---|---|
| | | | Appendix of IS : 561-1978* | Cl No. of IS : 6940-1982† |
| (1) | (2) | (3) | (4) | (5) |
| i) | Lindane ( *Gamma* isomer ) content, percent by mass, *Min* | 99·5 | A | — |
| ii) | Moisture, percent by mass, *Max* | 0·1 | — | 4 |
| iii) | Matter insoluble in acetone, percent by mass, *Max* | 0·05 | — | 9 |
| iv) | Acidity ( as HCl ), percent by mass, *Max* | 0·1 | B | — |
| v) | Setting point, *Min* | 112°C | — | 8 |

*Specification for BHC ( HCH ) dusting powders ( *fourth revision* ).
†Methods of test for pesticides and their formulations ( *first revision* ).

## 3. PACKING AND MARKING

**3.1 Packing** — The material shall be packed according to requirements given in IS : 8190 (Part I )-1980*.

**3.2 Marking** — The container shall bear legibly and indelibly the following information and any other information as is necessary under the *Insecticides Act* and Rules:

a) Name of the material;
b) Name of the manufacturer;
c) Date of manufacture;
d) Batch number;
e) Lindane content, percent ( *m/m* );
f) Net mass of the contents; and
g) The cautionary notice as worded in *Insecticides Act* and Rules.

---

*Requirements for packing of pesticides : Part I Solid pesticides ( *first revision* ).

### 3.3 BIS Certification Marking

The product may also be marked with Standard Mark.

3.3.1 The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

## 4. SAMPLING

**4.1** Representative samples of the material shall be drawn as prescribed in IS : 10946-1984*.

## 5. TESTS

**5.1** Tests shall be carried out by appropriate methods referred to in col 4 and 5 of Table 1.

**5.2 Quality of Reagents** — Unless specified otherwise, pure chemicals and distilled water ( *see* IS : 1070-1977† ) shall be employed in the tests.

NOTE — ' Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of the analysis.

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*Methods for sampling of technical grade pesticides.

†Specification for water for general laboratory use ( *second revision* ).

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